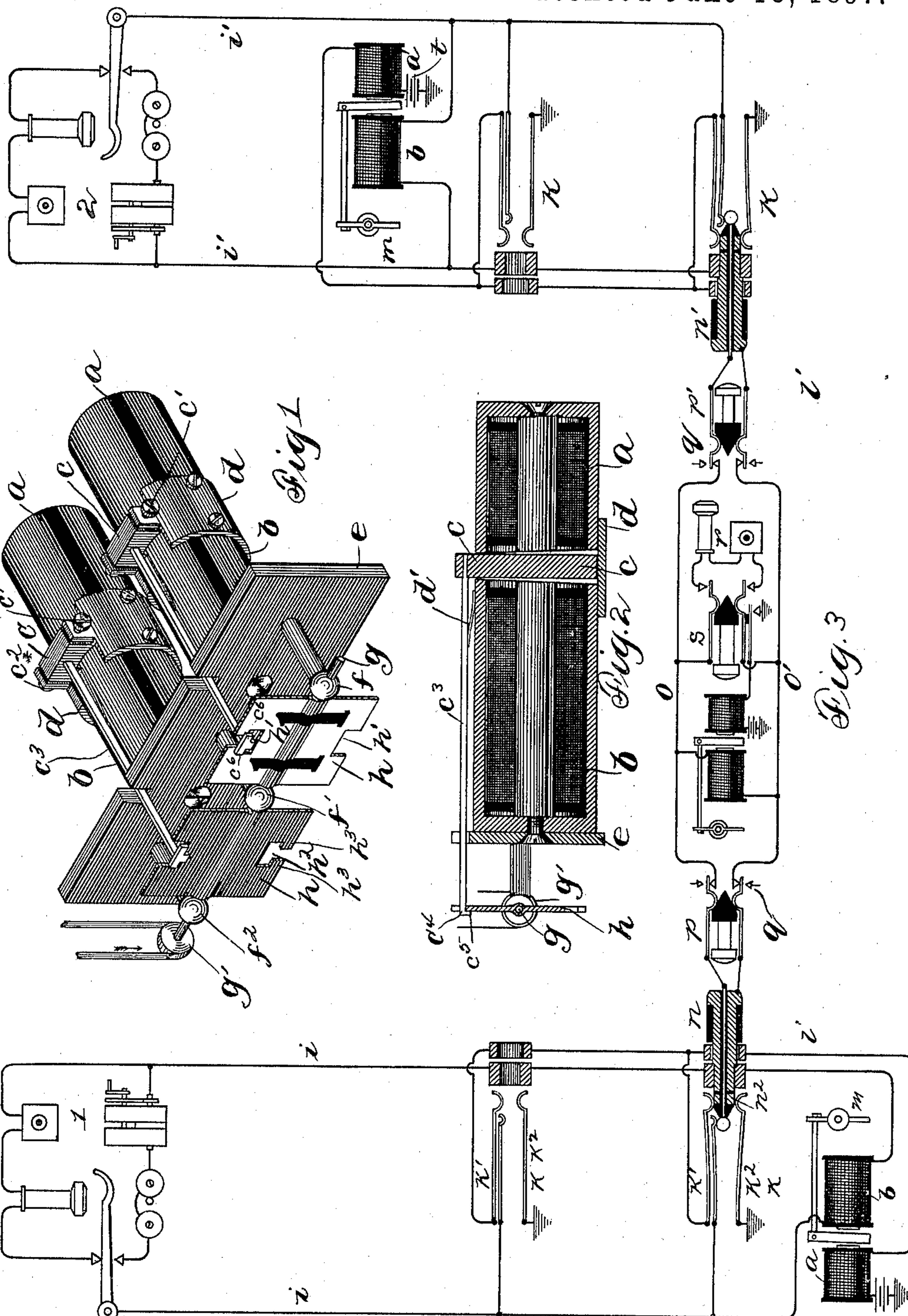


(No Model.)

C. E. SCRIBNER.  
APPARATUS FOR TELEPHONE SWITCHBOARDS.

No. 584,414.

Patented June 15, 1897.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR TELEPHONE-SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 584,414, dated June 15, 1897.

Application filed April 26, 1893. Serial No. 471,977. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Apparatus for Telephone-Switchboards, (Case No. 327,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to apparatus for automatically exhibiting and resetting the indicators of signal-receiving annunciators of telephone-switchboards. Its object is to provide a mechanically-actuated device controlled by means of electromagnets for exhibiting or withdrawing the indicator of the annunciator.

Heretofore annunciators have been provided with shutters adapted to be actuated by gravity when released by means of a controlling electromagnet, and in some instances auxiliary electromagnets have been provided to reset or restore the indicators to their normal positions through the medium of suitable levers or other devices.

In my invention I have aimed to provide an annunciator having an indicator adapted to be actuated and restored by mechanical power, the operation thereof being controlled by electromagnets. By this arrangement the necessity for light and delicately-balanced moving parts as heretofore employed is avoided and reliability of action is insured, since a sufficient power to move a considerable weight of mechanism may readily be controlled by comparatively small and feeble electromagnets.

In one form of my improved annunciator I employ a continuously-rotating shaft carrying a vane movable upon the shaft with considerable friction, in combination with electromagnets and a catch controlled thereby normally engaging with the vane and retaining it immovable. The catch is of such form in relation to the portions of the vane with which it is adapted to engage that when in one of its positions, as influenced by one of the magnets, which I shall term the "operating-magnet," it will engage with either edge

of the rotating vane to retain it; but when under the control of the other magnet (the restoring-magnet) it is thrown into its alternate position it will engage with only a particular edge of the vane, holding the latter in position to conceal the indicator-signal. The operating-magnet is included in the signaling-circuit of a telephone-line. The restoring-magnet is in a local circuit which is closed only during the existence of a connection with the line, after the manner of the automatically-restoring annunciators in common use. The vane may have a suitable number or other indication painted upon it, the normal position of the vane being that in which the indication is concealed, the other face of the vane only being visible to the attendant. When the operating-magnet is traversed by signaling-current, it attracts the armature controlling the retaining-catch and releases the vane. The latter being thus freed rotates slowly, carried by its friction upon the shaft, until it has executed a half-revolution, when it is again engaged by the catch, the latter having returned to its normal position by the discontinuance of the signaling-current. The vane is thus brought into and retained in position to disclose the indication upon it. It remains in this position until the operator effects the desired connection with the line. When this is done, the normally open local circuit is closed, energizing the restoring-magnet of the annunciator, and the latter attracts the armature and again releases the vane, permitting it to execute a further half-revolution, after which it is again engaged by the catch and retained in position to conceal the indication.

My invention is illustrated in the accompanying drawings and may be more fully described in connection therewith.

In the drawings, Figure 1 is a perspective view of two of my improved annunciators mounted upon a common supporting-plate and connected with a common revolving shaft. Fig. 2 is a longitudinal central sectional view of a single annunciator. Fig. 3 is a diagram showing my improved annunciator in combination with the circuits and switching mechanism of a telephone-exchange system.



Referring to Figs. 1 and 2, the annunciator shown therein comprises two tubular electromagnets *a* and *b*, arranged in axial alinement with their poles facing each other. Between the opposed poles is suspended an armature *c*, pivoted upon trunnions *c'* *c*<sup>2</sup>, carried by a bracket *d*, secured to the shells of the two tubular magnets, which also serves as the means of attachment between the two magnets. A light spring *d'* is fixed at one end to the shell of magnet *b* and acts upon an arm carried by armature *c* to maintain the armature normally in a position intermediate between the two poles. The magnet *b* is fixed at its closed end to a plate *e*, which serves as the common supporting-plate of several annunciators. Upon the face of the plate *e* are provided bearings *f* *f'* *f*<sup>2</sup>, in which is journaled a shaft *g*, carrying a pulley *g'* at one extremity, by which power may be transmitted to it. Upon the shaft *g* is placed, in front of each annunciator, a vane *h*, within the bearing of which the shaft is permitted to rotate with considerable friction. In one edge of the vane *h* a rectangular notch *h'* is cut. In the other edge a notch *h*<sup>2</sup> of peculiar shape is formed, having lugs or extensions *h*<sup>3</sup>. The armature *c* carries an arm *c*<sup>3</sup>, which extends forward and terminates in a catch *c*<sup>4</sup>. This catch is provided with a downward extension *c*<sup>5</sup>, which engages with the bottom of the notch *h'* when the armature is in its normal position, unattracted by either magnet. It has also two lateral extensions *c*<sup>6</sup>, which are adjusted to engage with the lugs *h*<sup>3</sup> upon the vane *h* when the armature is attracted by the magnet *b* and the catch is in its uppermost position. The shaft *g* is maintained in continuous slow rotation and tends to rotate with it the vanes *h* of the different annunciators. When the magnet *b* is energized, it attracts the armature *c* and lifts the extension *c*<sup>5</sup> of the catch *c*<sup>4</sup> out of engagement with the vane, releasing the latter and permitting it to revolve with the shaft *g*. The vane continues to revolve until it has executed a complete half-revolution. Before the expiration of the time required in reaching this position the signaling-current will have ceased and the magnet *b* will be no longer energized. The catch *c*<sup>4</sup> will thus have returned to its normal position and the lugs *h*<sup>3</sup> will come into engagement with the lateral extensions *c*<sup>6</sup> of the catch *c*<sup>4</sup>, whereby the further rotation of the shutter will be prevented. The distinctive number of the annunciator is thus exposed upon the face of the vane, as shown in the annunciator at the right. When now the magnet *a* is energized, the armature *c* is drawn in the opposite direction, lowering the catch *c*<sup>4</sup> until the lateral extensions *c*<sup>6</sup> thereof are disengaged from the lugs *h*<sup>3</sup>, permitting the vane *h* to continue its revolution. When it has rotated through another half-revolution, the bottom of the notch *h'* again comes against the extension *c*<sup>5</sup> of the catch, the latter being now drawn to its lowest position by the attraction

of magnet *a*. The vane is thus again prevented from further rotation, and although the magnetization of magnet *a* ceases and the armature is no longer attracted the catch *c*<sup>4</sup> rises only to a distance insufficient to become disengaged from the vane, whereby the latter is held until the magnet *b* is again energized. The indicator or vane of the annunciator is thus both actuated and restored by mechanical power, as distinguished from the electromagnetic force hitherto employed, the application of the power being determined and controlled by the electromagnets.

In Fig. 3 I have shown two of my improved annunciators connected in different line-circuits and located upon multiple switchboards, in combination with local circuits, for effecting the resetting of the annunciators. The usual switching appliances for establishing connection between the different lines are shown in position of looping the two lines together for communication.

The substations 1 and 2 of the exchange system are equipped with the usual telephonic and signaling appliances. The substations are connected by line-circuits *i* and *i'*, respectively, with spring-jacks *k* upon two different sections *l* and *l'* of a multiple switchboard, each line being connected with one spring-jack upon each section. Each line-circuit also includes the operating-coil *b* of annunciator *m*, the annunciators being located upon different switchboards, so as to be under the care of different attendant operators.

Connection is established between the different lines by means of loop-plugs *n* and *n'*, whose corresponding contact-pieces are united through conductors *o* and *o'*. Included in these conductors are calling-keys *p* and *p'*, each adapted to loop a calling-generator *q* into circuit with the corresponding plug. A telephone set *r* is provided for the operator and a key *s*, whereby the telephone may be connected with or disconnected from the plug-circuit *o* *o'*.

In addition to the line-contacts of the spring-jacks local contact-springs *k'* and *k*<sup>2</sup> are provided upon each jack. The springs *k'* and *k*<sup>2</sup> of the spring-jacks of one line constitute the normally-separated terminals of a local circuit which includes a source *t* of current and the restoring-magnet *a* of the individual annunciator of the same line. The plugs are provided with contact-rings *n*<sup>2</sup>, which cross together the local springs *k'* and *k*<sup>2</sup> of the spring-jacks into which they are inserted, thus completing the local circuits and causing the restoring-magnets of the corresponding annunciators to be energized.

In the operation of the system a subscriber—for example, subscriber at station 1—desiring connection with another line rotates his signaling-generator, thus sending a signaling-current over his line-circuit to the central office, where it finds circuit through the operating-magnet of the annunciator, permitting the indication of the annunciator to be dis-



played. The operator under whose care the annunciator is placed inserts one connecting-plug of a pair into the spring-jack of the line whose annunciator indicates the signal and receives the order for the desired connection through the medium of her telephone set. She then completes the connection between the calling-line and the line called for by inserting the remaining plug of the pair into the spring-jack of the latter line. By the act of inserting the connecting-plug into the spring-jack of the calling-line the local circuit of that line was closed, as described, whereby the indicator-vane of the annunciator was permitted to return to its normal position, concealing the indication. When upon the completion of the conversation the plugs are removed from the spring-jacks and the lines are thereby disconnected from each other, the annunciator remains in this position until another signaling-current traverses it.

Obviously many other forms of signal-receiving annunciator might be constructed embodying the principle of my invention without departing from the essential features of it. Hence I do not limit myself to the form shown; but

I claim, broadly, as new and desire to secure by Letters Patent—

1. In combination, in an electric annunciator, an indicator frictionally connected with a source of mechanical power, a retaining-catch normally engaging with said indicator, controlled by an electromagnet, substantially as described.

2. The combination with a continually-rotating shaft, of a vane having a frictional bearing thereon, a catch controlled by an electromagnet, normally engaging the vane but adapted to release the vane when the magnet is energized, substantially as described.

3. The combination with a constantly-rotating shaft, of a vane having a frictional bearing upon the shaft, an electromagnet, and a catch controlled by the electromagnet adapted to engage with either edge of the vane to retain it in a fixed position when the magnet is not energized, substantially as described.

4. The combination with a constantly-revolving shaft, of a vane revolving with friction thereon, two electromagnets, a common armature therefor adapted to be moved in one direction by one of the magnets and in the other direction by the other magnet, a catch controlled by the said armature adapted to engage with one edge of the vane to retain it immovable when in one of its extreme positions and to engage with the other edge of

the vane when in its other extreme position, whereby the successive magnetization of the two magnets permits the vane to execute a complete revolution, substantially as described.

5. The combination with the magnets *a* and *b*, of the common armature *c* therefor, a catch *c*<sup>4</sup> controlled thereby, the revolving shaft *g*, the vane *h* carried thereon, the catch *c*<sup>4</sup> being adapted to engage with one edge of the vane when in one of its extreme positions and with the other edge of the vane when in the other of its extreme positions, substantially as described.

6. The combination with a continually-moving body, of an indicator capable of assuming two different positions, mechanism adapted to cause or permit the indicator to be carried with the moving body from either position to the other position, two electromagnets controlling the said mechanism, one of the magnets being included in a telephone signaling-circuit and the other being included in a local circuit adapted to be closed by the act of establishing connection with the line, one of the magnets being adapted to actuate the mechanism to cause the indicator to be moved from its normal to its alternate position, the other magnet controlling the mechanism to return the indicator to its normal position, substantially as described.

7. In combination a continually-operative source of mechanical power, an indicator capable of assuming two positions, mechanism adapted to connect said indicator with said source of power to move it into one of said positions, and other mechanism adapted to cause its return to the other of said positions, said mechanism being controlled by an electromagnet, substantially as described.

8. In combination a continuously-operative source of mechanical power, an indicator having a normal position of concealment and a position of display, said indicator being adapted to assume said positions successively under the action of said source of power, and electromagnetically-actuated mechanism controlling the action of said source of power upon the indicator to determine the position assumed by the indicator, substantially as described.

In witness whereof I hereunto subscribe my name this 22d day of March, A. D. 1893.

CHARLES E. SCRIBNER.

Witnesses:

ELLA EDLER,  
LUCILE RUSSELL.